AMENDMENTS TO THE CLAIMS

1. (Previously Presented) A tracking error detection apparatus comprising:

a photodetector comprising four photoreceptor elements which are partitioned along a tangential direction and a perpendicular direction with respect to an information track that is recorded as an information pit line on an optical disc to be played;

zerocross detection circuits for detecting zerocross points at which two digital signals intersect center levels of the respective digital signals, each of said two digital signals being obtained by adding output signals from the two photoreceptor elements positioned on a diagonal line, among four signals that are generated according to the amounts of light received by the respective photoreceptor elements and are outputted from the photodetector;

a phase difference detection circuit for performing phase comparison based on a distance between the zerocross points of the two digital signals, and limiting a result of phase comparison to a value under a first predetermined value when the result of phase comparison is larger than the first predetermined value; and

a low-pass filter for performing band restriction to a signal outputted from the phase difference detection circuit to obtain a tracking error signal, wherein,

the first predetermined value is a maximum value of the tracking error signal, the maximum value being based on a relationship between a shortest pit length and a track pitch of the optical disc to be played.

2. (Previously Presented) A tracking error detection apparatus as defined in Claim 1 wherein said phase difference detection circuit comprises:

a phase difference calculation unit for calculating a distance between the zerocross points of the two digital signals, and successively outputting the distance as a result of phase comparison;

a pulse generation unit for generating pulse signals each corresponding to one sampling clock at positions where the two digital signals perform zerocross, respectively, and outputting a phase comparison end pulse based on the generated pulse signals;

a data updation unit for updating output data based on the result of phase comparison successively outputted from the phase difference calculation unit, at every phase comparison end pulse outputted from the pulse generation unit, and maintaining an output level of the output data until the next phase comparison end pulse occurs; and

a limit control unit for judging whether the output level of the output data from the data updation unit is larger than the first predetermined value or not, limiting the output level of the output data to a value under the first predetermined value when the output level of the output data from the data updation unit is larger than the first predetermined value, and outputting the output data.

3-7. (Canceled).

8. (Previously Presented) A tracking error detection apparatus comprising:

a photodetector comprising four photoreceptor elements which are partitioned along a tangential direction and a perpendicular direction with respect to an information track that is recorded as an information pit line on an optical disc to be played;

zerocross detection circuits for detecting zerocross points at which four digital signals intersect center levels of the respective digital signals, said four digital signals being generated according to the amounts of light received by the respective photoreceptor elements and are outputted from the photodetector;

a first phase difference detection circuit for performing phase comparison based on a distance between the zerocross points of two digital signals obtained from the photoreceptor elements positioned forward in the advancing direction of the information track, among the four digital signals, and limiting a result of phase comparison to a value under the first predetermined value when the result of phase comparison is larger than the first predetermined value; and

a second phase difference detection circuit for performing phase comparison based on a distance between the zerocross points of two digital signals obtained from the photoreceptor elements positioned backward in the advancing direction of the information track, among the four digital signals, and limiting a result of phase

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comparison to a value under the first predetermined value when the result of phase comparison is larger than the first predetermined value;

an addition circuit for adding the output signals of the first and second phase difference detection circuits; and

a low-pass filter for performing band restriction to the signal outputted from the addition circuit to obtain a tracking error signal, wherein

the first predetermined value is a maximum value of the tracking error signal, the maximum value being based on a relationship between a shortest pit length and a track pitch of the optical disc to be played.

9. (Previously Presented) A tracking error detection apparatus as defined in Claim 8 wherein each of said first and second phase difference circuits comprises:

a phase difference calculation unit for calculating a distance between the zerocross points of the two digital signals, and successively outputting the distance as a result of phase comparison;

a pulse generation unit for generating pulse signals each corresponding to one sampling clock at positions where the two digital signals perform zerocross, respectively, and outputting a phase comparison end pulse based on the generated pulse signals;

a data updation unit for updating output data based on the result of phase comparison successively outputted from the phase difference calculation unit, at every phase comparison end pulse outputted from the pulse generation unit, and maintaining an output level of the output data until the next phase comparison end pulse occurs; and

a limit control unit for judging whether the output level of the output data from the data updation unit is larger than the first predetermined value or not, limiting the output level of the output data to a value under the first predetermined value when the output level of the output data from the data updation unit is larger than the first predetermined value, and outputting the output data.

10-14. (Canceled).

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